DOCKET NO: 248430US6

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
KEN IIZUKA	: EXAMINER: TSAI, T.
SERIAL NO: 10/768,088	:
FILED: FEBRUARY 2, 2004	: GROUP ART UNIT: 2624
FOR: IMAGE MATCHING SYSTEM AND IMAGE MATCHING METHOD AND PROGRAM	:

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from the decision of the Examiner dated November 14, 2007 which finally rejected Claims 1-25 in the above-identified patent application. A Notice of Appeal was timely filed on March 14, 2008.

I. REAL PARTY-IN-INTEREST

The real party-in-interest is Sony Corporation.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative, and the assignees are aware of no prior or pending appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-25 have been finally rejected and form the basis for this appeal. Appendix VIII includes a clean copy of Claims 1-25.

IV. STATUS OF AMENDMENTS

No amendments after final rejection were filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 1 is directed to an image matching system for matching a first image and a second image including a correction information generating means for performing a Fourier transform (FFT processing unit 13, page 10, lines 19-24 and Figure 1) and a log-polar coordinate transform to the first image and the second image (coordinate transform unit 14, page 10, line 25 to page 11, line 3 and Figure 1) and generating correction information of the first image based on the results of the Fourier transform and log-polar coordinate transform (scalar information-rotation information generation unit 213, page 18, line 16 to page 19, line 3 and Figure 2), and a matching means for performing processing of correction of the first image based on the correction information generated by the correction information generating means to generate a corrected first image (correction unit 22, page 19, lines 4-19 and Figure 2), performing a correlation comparison between the corrected first image and the second image (correlation value generation unit 241, page 21, lines 12-15 and Figure 2), and determining if the corrected first image matches the second image based on results of the correlation processing (judgment unit 242, page 22, lines 10-19 and Figure 2).

Independent Claim 9 is directed to an image matching method for matching a first image and a second image including performing a Fourier transform and a log-polar coordinate transform to the first image and the second image (page 10, line 19 to page 11,

line 3), generating correction information of the first image based on the results of the Fourier transform and log-polar coordinate transform (page 18, line 16 to page 19, line 3), correcting the first image based on the correction information (page 19, lines 4-19), performing a correlation comparison of the corrected the first image and the second image (page 21, lines 12-15), and determining if the corrected first image matches the second image based on results of the correlation comparison (page 22, lines 10-19).

Independent Claim 17 is directed to a computer readable medium including computer executable instructions, wherein the instructions, when executed by a processor, cause the processor to perform a method for matching a first image and a second image. The method includes performing a Fourier transform and a log-polar coordinate transform to the first image and the second image (page 10, line 19 to page 11, line 3), generating correction information of the first image based on the results of the Fourier transform and log-polar coordinate transform (page 18, line 16 to page 19, line 3), correcting the first image based on the correction information (page 19, lines 4-19), performing a correlation comparison of the corrected the first image and the second image (page 21, lines 12-15), and determining if the corrected first image matches the second image based on-results of the correlation comparison (page 22, lines 10-19).

Independent Claim 25 is directed to an image matching system for matching a first image and a second image including a correction information generating unit configured to perform a Fourier transform (FFT processing unit 13, page 10, lines 19-24 and Figure 1) and a log-polar coordinate transform on the first image and the second image (coordinate transform unit 14, page 10, line 25 to page 11, line 3 and Figure 1), and to generate correction information of the first image based on the results of the Fourier transform and log-polar coordinate transform (scalar information-rotation information generation unit 213, page 18, line 16 to page 19, line 3 and Figure 2), a correction unit configured to correct the first image

based on the correction information to generate a corrected first image (correction unit 22, page 19, lines 4-19 and Figure 2), a correlation unit configured to perform a correlation comparison between the corrected first image and the second image (correlation value generation unit 241, page 21, lines 12-15 and Figure 2), and a matching unit configured to determine if the corrected first image matches the second image based on results of the correlation unit (judgment unit 242, page 22, lines 10-19 and Figure 2).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are

(a) whether Claims 1-6, 9-14, 17-22, and 25 are anticipated under 35 U.S.C. §102(b) by Wendt (U.S. Patent Application Publication No. 20020090109); and

(b) whether Claims 7, 8, 15, 16, 23, and 24 are unpatentable under 35 U.S.C. §103(a) over Wendt in view of Oosawa (U.S. Patent Application Publication No. 20030039405).

VII. ARGUMENTS

A. Claims 1-6, 9-14, 17-22, and 25 are not anticipated by Wendt

Claim 1 recites in part:

> a correction information generating means for performing a Fourier transform and a log-polar coordinate transform to said first image and said second image and generating correction information of said first image based on the results of said Fourier transform and log-polar coordinate transform; and
>
> a matching means for performing processing of correction of said first image based on said correction information generated by said correction information generating means to generate a corrected first image, performing a correlation comparison between said corrected first image and said second image, and determining if the corrected first image matches the second image based on results of said correlation processing.

Wendt describes a watermark detection method in which a watermark may be corrected before information is read therefrom.[1] The watermark includes a first preselected pattern of data ***and*** a second preselected pattern of data on the same frame or frames as the first preselected pattern of data.[2] The outstanding Office Action cited paragraphs 22-27 of Wendt as describing "a matching means" as recited in Claim 1.[3] However, it is respectfully submitted that paragraph 23 of Wendt describes that an actual (i.e. uncorrected) watermark in digital content is compared to reference information, a deviation from the reference information is calculated, and the information included in a watermark is read using the calculated deviation information. Thus, it is respectfully submitted that Wendt does not teach that the calculated deviation information is used to create a corrected watermark, ***and that the corrected watermark is compared to any other reference***.

In response to this argument, the outstanding Office Action asserts that paragraph 27 of Wendt describes "what the matching means are match against." However, the only comparison described in paragraph 27 of Wendt is step (2), which describes a comparison between an actual and reference pattern to determine a rotation angle or resizing factor. As this rotation angle or resizing factor is cited as "correction information,"[4] this comparison cannot be a comparison using "a corrected first image," as the "correction information" has not been generated yet. Therefore, Wendt does not describe determining if the ***corrected first image*** matches the second image based on results of correlation processing.

Further, once Wendt determines the deviation information based on the first preselected pattern of data, the second pattern of preselected data is simply read using the deviation information. Thus, Wendt does not describe any means for performing a correlation comparison between a ***corrected first image*** and a second image, or means for

[1]See Wendt, paragraph 13.
[2]See Wendt, paragraph 14.
[3]See the outstanding Office Action at page 2, lines 11-17 and page 8, line 5 to page 9, line 19.
[4]See the outstanding Office Action at page 7, lines 9-11.

determining if a ***corrected first image*** matches a second image based on results of correlation processing.

In response to this particular argument, the outstanding Office Action cites paragraph 13 of Wendt as disclosing "first and second images."[5] However, as noted above, the first and second preselected patterns of data are both part of the watermark of Wendt, and they are ***never*** compared to each other. The first preselected pattern of data is compared to a reference to determine the deviation information, and the deviation information is used to read the second preselected pattern of data. Again, no part of Wendt performs a correlation comparison between a ***corrected first image*** and a second image, or determines if a ***corrected first image*** matches a second image based on results of correlation processing.

Finally, the Advisory Action of February 6, 2008 states "Wendt teaches in page 3 paragraph 0041 discloses regarding a correlation detector for defects such as rotate, resize and other alter geometric configuration, this is seen the comparing function. Page 4 paragraph 0049 discloses regarding where the correlation detector will be used to compare the reference geometric and any deviation between. Where the comparison will be between the calculated actual orientation, size ... etc. This 'actual orientation ... size etc.' is seen as the correct image for comparison."

Thus, the Advisory Action apparently alleges that the comparison of the original watermark 10 to a reference to geometric configuration describes "matching means" as recited in Claim 1 because Wendt refers to "a correlation detector" in paragraphs 41 and 49. However, such an analysis ignores the rest of the features of the claimed "matching means," which is contrary to *In re Wilson*, holding that ***all words in a claim*** must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). (Emphasis added). As noted above, the claimed

[5]See the outstanding Office Action at page 3, line 1 to page 5, line 2.

"matching means" performs a correlation comparison between a ***corrected first image*** and a second image, and determines if a ***corrected first image*** matches a second image based on results of correlation processing. The simple reference to "a correlation detector" in Wendt does not teach such "matching means" in as great a detail as recited in Claim 1.

Therefore, is respectfully submitted Wendt does not teach "a matching means" as defined in Claim 1. Consequently, Claim 1 (and Claims 2-8 dependent therefrom) is not anticipated by Wendt and is patentable thereover.

Claims 9 and 17 recite in part:

> performing a correlation comparison of said corrected said first image and said second image; and
> determining if the corrected first image matches the second image based on-results of said correlation comparison.

As noted above, Wendt does not describe performing a correlation comparison between a ***corrected first image*** and a second image, or determining if a ***corrected first image*** matches a second image based on results of correlation processing. In this regard, the outstanding Office Action again particularly cites paragraph 13 of Wendt as describing this subject matter.[6] However, as noted above, the first and second preselected patterns of data are both part of the watermark of Wendt, and they are ***never*** compared to each other. The first preselected pattern of data is compared to a reference to determine the deviation information, and the deviation information is used to read the second preselected pattern of data.

The Advisory Action again cited the reference to "a correlation detector" in paragraph 41 of Wendt as a correlation comparison function. However, as noted above, the correlation detector described by Wendt compares an original watermark 10 with a reference geometric configuration. Thus, the correlation detector of Wendt does not anticipate "performing a correlation comparison of said ***corrected said first image*** and said second image" or

[6]See the outstanding Office Action at page 5, lines 3-21.

"determining if the ***corrected first image*** matches the second image based on-results of said correlation comparison." Further, simply stating that "a correlation detector" describes a "correlation comparison function" ignores the rest of the claimed features, which is contrary to *In re Wilson*, holding that ***all words in a claim*** must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). (Emphasis added).

Therefore, it is respectfully submitted Wendt does not teach "performing a correlation comparison" or "determining if the corrected first image matches the second image" as defined in Claims 9 and 17. Consequently, Claims 9 and 17 (and Claims 10-16 and 18-24 dependent therefrom) are not anticipated by Wendt and is patentable thereover.

Finally, Claim 25 recites in part:

> a correlation unit configured to perform a correlation comparison between said corrected first image and said second image; and
> a matching unit configured to determine if the corrected first image matches the second image based on results of said correlation unit.

Again, Wendt does not describe a device that performs a correlation comparison between a ***corrected first image*** and a second image, or that determines if a ***corrected first image*** matches a second image based on results of correlation processing. Therefore, is respectfully submitted Wendt does not teach "a correlation unit" or "a matching unit" as defined in Claim 25. Consequently, Claim 25 is not anticipated by Wendt and is patentable thereover.

B. Claims 7, 8, 15, 16, 23, and 24 are not unpatentable over Wendt in view of Oosawa

With regard to the rejection of Claims 7, 8, 15, 16, 23, and 24 as unpatentable over Wendt in view of Oosawa, it is noted that Claims 7, 8, 15, 16, 23, and 24 are dependent from

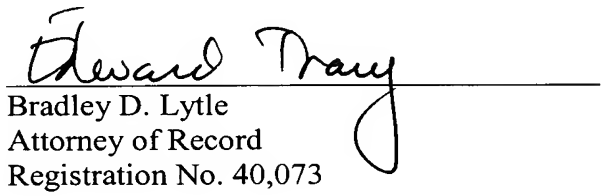
Claims 1, 9, and 17, and thus are believed to be patentable for at least the reasons discussed above. Further, it is respectfully submitted that Oosawa does not cure any of the above-noted deficiencies of Wendt. Accordingly, it is respectfully submitted that Claims 7, 8, 15, 16, 23, and 24 are patentable over Wendt in view of Oosawa.

Conclusion

It is respectfully requested that the outstanding rejections be REVERSED.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Bradley D. Lytle
Attorney of Record
Registration No. 40,073

Edward W. Tracy, Jr.
Registration No. 47,998

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/07)

I:\ATTY\ET\248430US\248430US-AB (2) 7.9.08.DOC

VIII. CLAIMS APPENDIX

Claim 1: An image matching system for matching a first image and a second image, comprising:

a correction information generating means for performing a Fourier transform and a log-polar coordinate transform to said first image and said second image and generating correction information of said first image based on the results of said Fourier transform and log-polar coordinate transform; and

a matching means for performing processing of correction of said first image based on said correction information generated by said correction information generating means to generate a corrected first image, performing a correlation comparison between said corrected first image and said second image, and determining if the corrected first image matches the second image based on results of said correlation processing.

Claim 2: An image matching system as set forth in claim 1, wherein said correction information generating means performs a further Fourier transform based on the results of said log-polar coordinate transform of said first image and said second image and generates scalar information and/or rotation information as said correction information based on correlation strength of said Fourier transformed first image and second image, and said matching means generates said corrected first image based on said scalar information and/or said rotation information generated by said correction information generating means.

Claim 3: An image matching system as set forth in claim 2, wherein said correction information generating means generates said scalar information and/or rotation information as said correction information based on correlation strength of phase information of said Fourier transformed first image and second image.

Claim 4: An image matching system as set forth in claim 1, wherein said correction information generating means performs a Fourier-Mellin transform to said first image and said second image, performs a correlation comparison between said Fourier-Mellin transformed first image and second image, and generates said scalar information and/or rotation information as said correction information.

Claim 5: An image matching system as set forth in claim 2, wherein said matching means generates said corrected first image based on said scalar information and/or said rotation information generated by said correction information generating means, performs processing for Fourier transforming said corrected first image and second image, and performs correlation comparison processing based on said Fourier transformed corrected first image and said Fourier transformed second image.

Claim 6: An image matching system as set forth in claim 2, wherein said matching means generates said corrected first image based on said scalar information and/or said rotation information generated by said correction information generating means, performs processing for Fourier transforming said corrected first image and second image, and performs correlation comparison processing based on phase information of said Fourier transformed corrected first image and said Fourier transformed second image.

Claim 7: An image matching system as set forth in claim 1, wherein said matching means generates parallel movement information of said corrected first image and second image based on a peak position of correlation strength of phase information of said corrected first image and second image, extracts common areas of said first image and said second image based on said movement amount information, performs processing for correlation of

said extracted common areas, and performs processing for matching said first image and said second image based on the results of said correlation processing.

Claim 8: An image matching system as set forth in claim 1, wherein said matching means generates parallel movement information of said corrected first image and second image based on a peak position of correlation strength of phase information of said corrected first image and second image and performs processing for matching said first image and said second image when said parallel movement information is smaller than a predetermined amount of parallel movement.

Claim 9: An image matching method for matching a first image and a second image, comprising:

performing a Fourier transform and a log-polar coordinate transform to said first image and said second image;

generating correction information of said first image based on the results of said Fourier transform and log-polar coordinate transform;

correcting said first image based on said correction information;

performing a correlation comparison of said corrected said first image and said second image; and

determining if the corrected first image matches the second image based on-results of said correlation comparison.

Claim 10: An image matching method as set forth in claim 9, wherein said performing a Fourier transform includes performing a second Fourier transform to the results of said log-polar coordinate transform of said first image and said second image, and

said generating correction information includes generating scalar information and/or rotation information as said correction information based on correlation strength of said Fourier transformed first image and second image, and

said correcting includes correcting said first image based on said scalar information and/or said rotation information.

Claim 11: An image matching method as set forth in claim 10, wherein said generating correction information includes generating said scalar information and/or rotation information as said correction information based on correlation strength of phase information said Fourier transformed first image and second image.

Claim 12: An image matching method as set forth in claim 9, wherein said performing a Fourier transform includes performing a Fourier-Mellin transform to said first image and said second image, and performing processing for correlation between said Fourier-Mellin transformed first image and second image, and

said generating correction information includes generating said scalar information and/or rotation information as said correction information.

Claim 13: An image matching method as set forth in claim 10, wherein said correcting includes correcting said first image based on said scalar information and/or said rotation information and performing a Fourier transform on said corrected first image and second image, and

said performing a correlation comparison includes performing a correlation comparison between said Fourier transformed corrected first image and said Fourier transformed second image.

Claim 14: An image matching method as set forth in claim 10, wherein said correcting includes correcting said first image based on said scalar information and/or said rotation information and performing a Fourier transform on said corrected first image and second image, and

said performing a correlation comparison includes performing a correlation comparison between phase information of said Fourier transformed corrected first image and said Fourier transformed second image.

Claim 15: An image matching method as set forth in claim 9, wherein said correcting includes generating parallel movement information of said corrected first image and second image based on a peak position of correlation strength of phase information of said corrected first image and second image, and extracting common areas of said first image and said second image from said movement amount information,

said performing a correlation comparison includes performing a correlation comparison between said extracted common areas, and

determining if the corrected first image matches the second image includes determining if the corrected first image matches the second image based on results of said correlation comparison between said extracted common areas.

Claim 16: An image matching method as set forth in claim 9, wherein said correcting includes generating parallel movement information of said corrected first image and second image based on a peak position of correlation strength of phase information of said corrected first image and second image, and

determining if the corrected first image matches the second image is performed when said parallel movement information is smaller than a predetermined amount of parallel

movement.

Claim 17: A computer readable medium including computer executable instructions, wherein the instructions, when executed by a processor, cause the processor to perform a method for matching a first image and a second image, the method comprising:

performing a Fourier transform and a log-polar coordinate transform to said first image and said second image;

generating correction information of said first image based on the results of said Fourier transform and log-polar coordinate transform;

correcting said first image based on said correction information;

performing a correlation comparison of said corrected said first image and said second image; and

determining if the corrected first image matches the second image based on-results of said correlation comparison.

Claim 18: A computer readable medium as set forth in claim 17, wherein performing a Fourier transform includes performing a second Fourier transform based on results of said log-polar coordinate transform of said first image and said second image, and

said generating correction information includes generating scalar information and/or rotation information as said correction information based on correlation strength of said Fourier transformed first image and second image, and

said correcting includes correcting said first image based on said scalar information and/or said rotation information.

Claim 19: A computer readable medium as set forth in claim 18, wherein said

generating correction information generates said scalar information and/or rotation information as said correction information based on correlation strength of phase information said Fourier transformed first image and second image.

Claim 20: A computer readable medium as set forth in claim 17, wherein said performing a Fourier transform performs a Fourier-Mellin transform to said first image and said second image, performs processing for correlation between said Fourier-Mellin transformed first image and second image, and generates said scalar information and/or rotation information as said correction information.

Claim 21: A computer readable medium as set forth in claim 18, wherein said correcting includes correcting said first image based on said scalar information and/or said rotation information and performs a Fourier transform on said corrected first image and second image, and

said performing a correlation comparison performs correlation comparison processing based on said Fourier transformed corrected first image and said Fourier transformed second image.

Claim 22: A computer readable medium as set forth in claim 19, wherein said correcting includes correcting said first image based on said scalar information and/or said rotation information generated at said first routine, performs a Fourier transform on said corrected first image and second image, and

said performing a correlation comparison performs correlation comparison processing based on phase information of said Fourier transformed corrected first image and said Fourier transformed second image.

Claim 23: A computer readable medium as set forth in claim 17, wherein said correcting generates parallel movement information of said corrected first image and second image based on a peak position of correlation strength of phase information of said corrected first image and second image, and extracts common areas of said first image and said second image based on said movement amount information,

said performing a correlation comparison performs a correlation comparison of said extracted common areas, and

said determining includes determining if the corrected first image matches the second image based on results of said correlation comparison of said extracted common areas.

Claim 24: A computer readable medium as set forth in claim 17, wherein said correcting generates parallel movement information of said corrected first image and second image based on a peak position of correlation strength of phase information of said corrected first image and second image, and

said determining includes determining if the corrected first image matches the second image when said parallel movement information is smaller than a predetermined amount of parallel movement.

Claim 25: An image matching system for matching a first image and a second image, comprising:

a correction information generating unit configured to perform a Fourier transform and a log-polar coordinate transform on said first image and said second image, and to generate correction information of said first image based on the results of said Fourier transform and log-polar coordinate transform;

a correction unit configured to correct said first image based on said correction

information to generate a corrected first image;

a correlation unit configured to perform a correlation comparison between said corrected first image and said second image; and

a matching unit configured to determine if the corrected first image matches the second image based on results of said correlation unit.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.